HACO

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performances

TOOLING CATALOGUE

Bending table

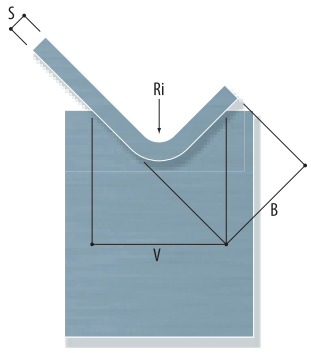

FIGURE 01

V = die-opening
B = minimum length of the leg for a bending angle α = 90°
Ri = internal radius of the bend
F = required bending force in tonnage per meter bending length
S = plate thickness in mm

Remark: this table is only suitable for mild steel with Rm = 450 N/mm² and E = 210000 N/mm² and only applicable to air bending!

V	F (T/m)	4	5	6	7	8	10	12	14	16	18	20	25	32	40	50	63	80	100	125	160	200	250
B	F (T/m)	2,8	3,5	4,2	4,9	5,7	7	8,5	10	11	13	14	18	23	28	35	45	57	71	88	113	141	177
Ri		0,6	0,8	1	1,1	1,3	1,6	1,9	2,2	2,6	2,9	3,2	4	5	6,5	8	10	13	16	20	25	32	40
S																							
0,5		4	3																				
0,6		6	5	4	3	3																	
0,8		7	8	7	6	5	4																
1		9	13	11	9	8	6	5															
1,2				15	13	12	9	8	7														
1,4					18	16	13	10	9	8													
1,6						20	16	14	12	10	9												
2							26	51	18	16	14	13											
2,3								28	24	21	19	17	14										
2,6									31	27	24	22	17	13									
3										36	32	29	23	18									
3,2											36	33	26	20	16								
3,5												39	31	24	20	16							
4												51	41	32	26	20							
4,5													52	40	32	26							
5														50	40	32	25						
6															58	46	37	29					
7															78	63	50	39	31				
8																82	65	51	41				
9																	82	65	52	41			
10																		80	64	51	40		
12																		115	92	74	58	46	
16																			164	131	102	82	65
19																				185	144	115	92
22																					193	155	124
25																					250	200	160
30																						288	230

CONFIGURATIONS

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Different tool-systems are offered to fulfill the specific needs of the customers.

Configuration 1: HACO

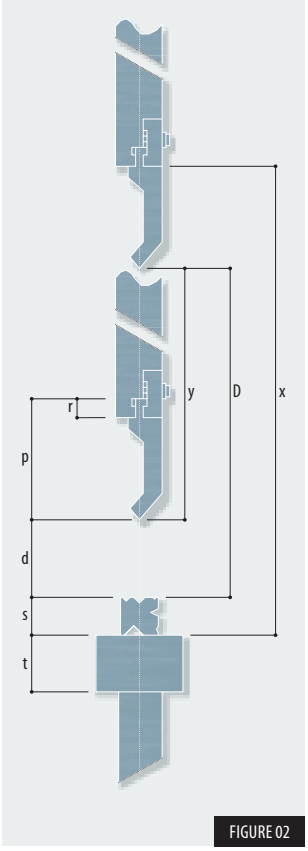

FIGURE 02

Configuration 2: SYSTEM

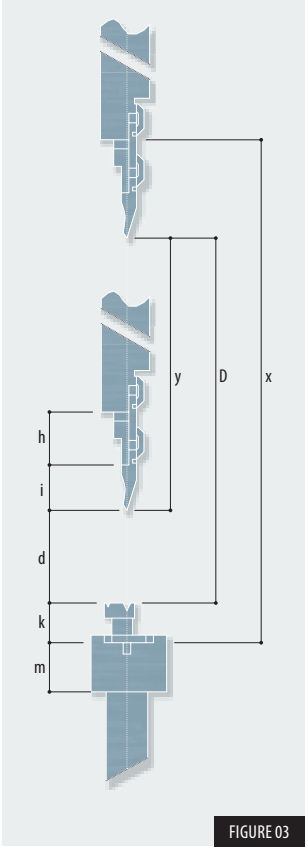

FIGURE 03

Configuration 3: NEW STANDARD

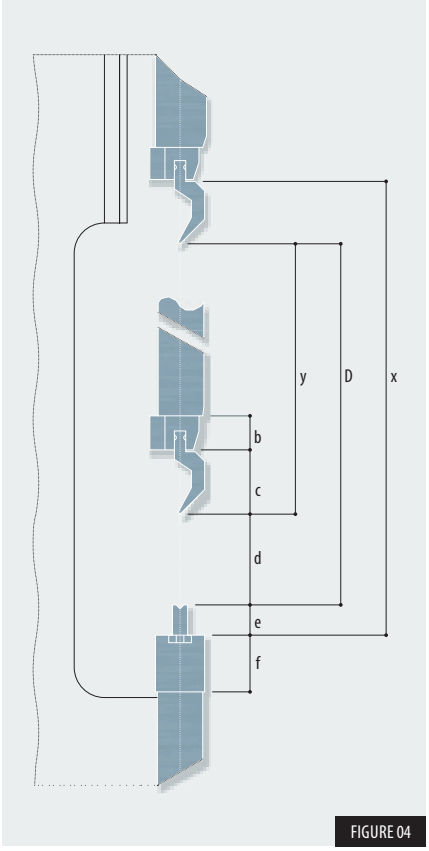

FIGURE 04

legend

b = height modufix manual/hydraulic clamping
c = height equidur tooling
D = remaining opening - ram in top dead centre
d = remaining opening - ram in bottom dead centre
e = height OZU – Single-V die
f = height (anti-deflection-) table for OZU – Single-V die
h = height intermediate part System tooling
i = height punch System tooling
k = height die System tooling
m = height (anti-deflection-) table for System tooling
p = total height punch Haco type
r = height clamping Haco type punch
s = height Haco type Multi-V die
t = height (anti-deflection-) table for Haco Multi-V die
x = total daylight-opening
y = stroke

Remaining opening d when ram is in top dead centre?

- D = X - P + R - S ..... when using configuration 1
- D = X - H - I - K ..... when using configuration 2
- D = X - C - E ..... when using configuration 3

'D' must be at least = plate thickness + desired daylight-opening (so positif).

Remaining opening d when ram is in bottom dead centre?

- d = X - P + R - S - Y ..... when using configuration 1
- d = X - H - I - K - Y ..... when using configuration 2
- d = X - C - E - Y ..... when using configuration 3

'd' always needs to be a negative value.
'd' always needs to be at least half the V-opening to be able to bend down to 90° (e.g. V-opening = 12 mm => 'd' needs to be ≤ -6 mm).

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The dimensions for the clamping of Haco tools depend on the tonnage of the pressbrake.
Following dimensions are valid:

Capacity < 150 T

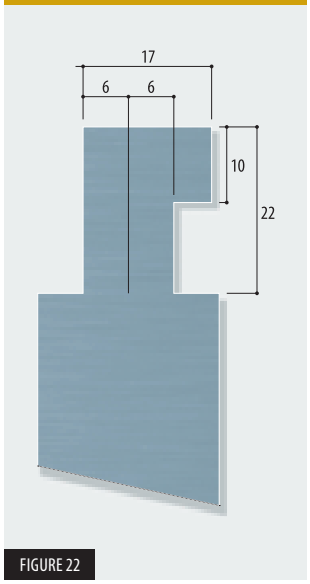


FIGURE 22

175 T ≤ capacity ≤ 260 T

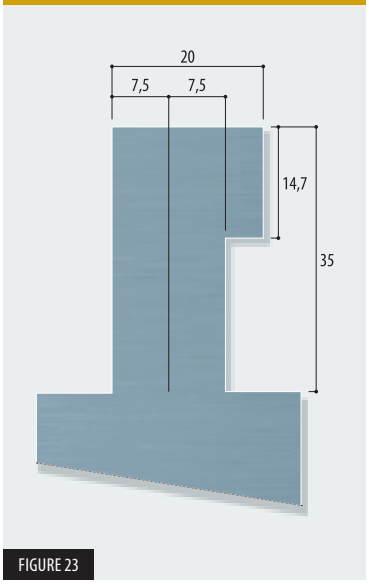


FIGURE 23

300 T ≤ capacity ≤ 400 T

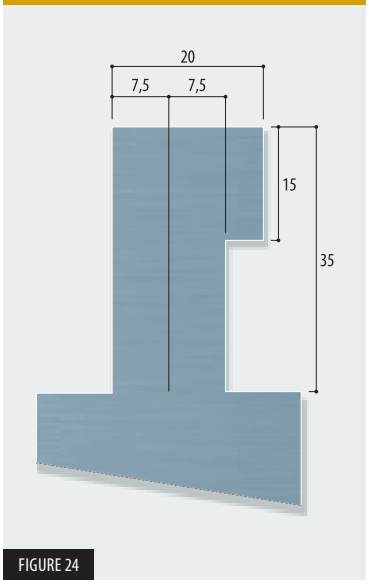


FIGURE 24

500 T ≤ capacity ≤ 600 T

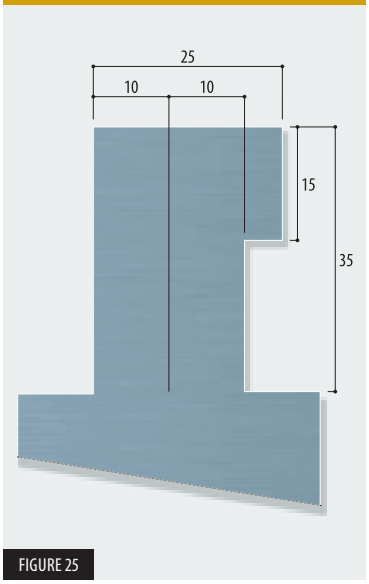


FIGURE 25

Tooling for pressbrakes with a capacity over 600 tons are available on request. In addition to the standard tooling shown in this catalogue, tooling can be supplied to suit the customers specific requirements, details are available on request.

Haco punches are available with standard cutting, starting with a minimum bending length of 2100 mm.

reference	constituing lengths																										total length
PCUT 32	35	+	40	+	45	+	50	+	55	+	60	+	70	+	100	+	200	+	400	+	800	+	rest				1855 + rest
PCUT 40	35	+	40	+	45	+	50	+	55	+	60	+	70	+	100	+	200	+	400	+	800	+	1000	+	1000	+	rest	3855 + rest

On request, Haco–punches can be subdivided in different lengths according to the wishes of the customer. For each cut you need to calculate a loss of about 5 mm.

FIGURE 26

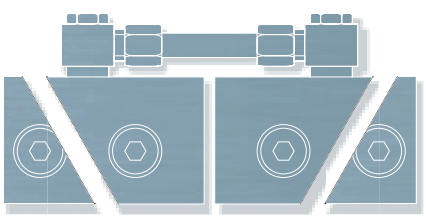
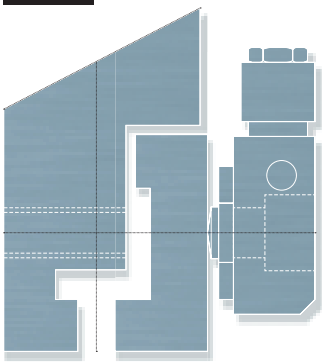


FIGURE 27



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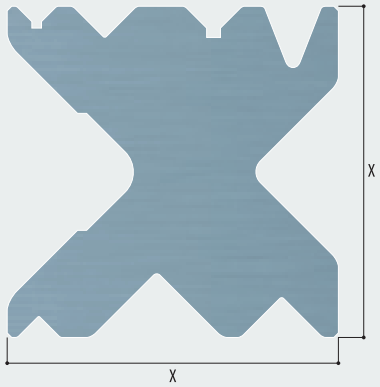
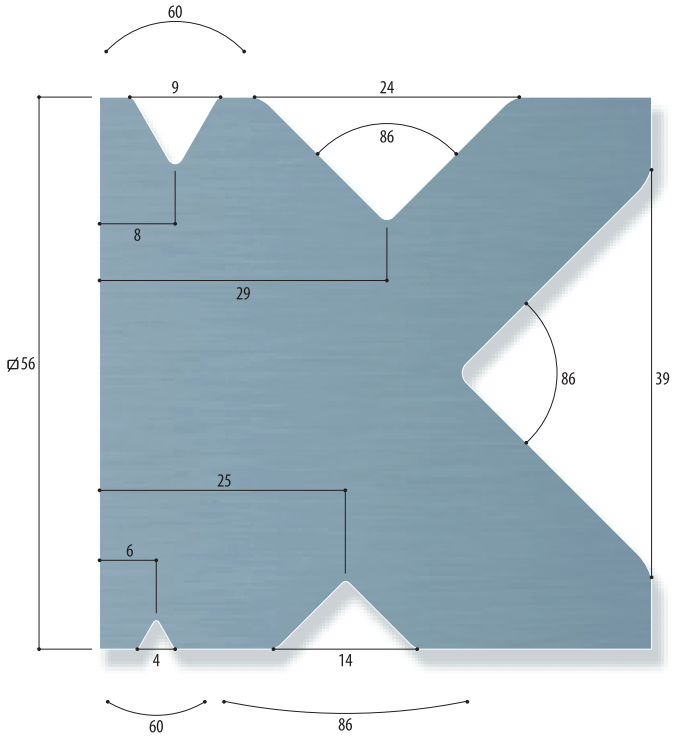
V-OPENING (mm)																										X (mm)
SERIE	4	9	9,5	10	12	13	14	15	16	19	20	22	24	25	32	35	38	39	40	50	52	55	60	76	80	120	160	(figure 26)
400 kN	•	•					•						•					•										56
600 - 750 kN		•			•			•					•			•												70
1100 - 1500 kN				•				•	•						•							•						90
1750 - 2600 kN			•			•			•	•				•			•				•			•				100
3000 - 4000 kN											•		•		•				•				•		•			125
5000 - 6000 kN				•								•			•					•					•	•		160
7000 - 10000 kN																			•				•			•	•	200

FIGURE 28



DIE	
40 T	
order number	length
PV5615	1600
PV5620	2100
PV5625	2600



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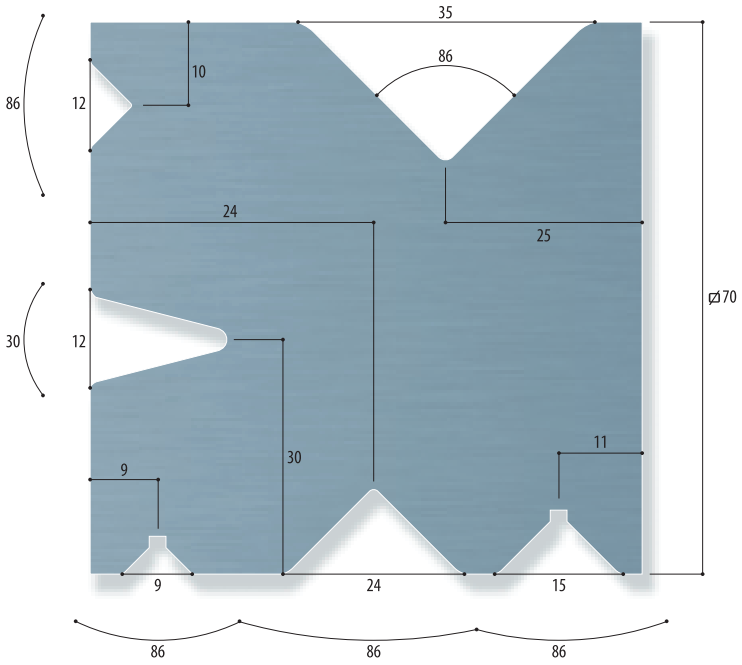
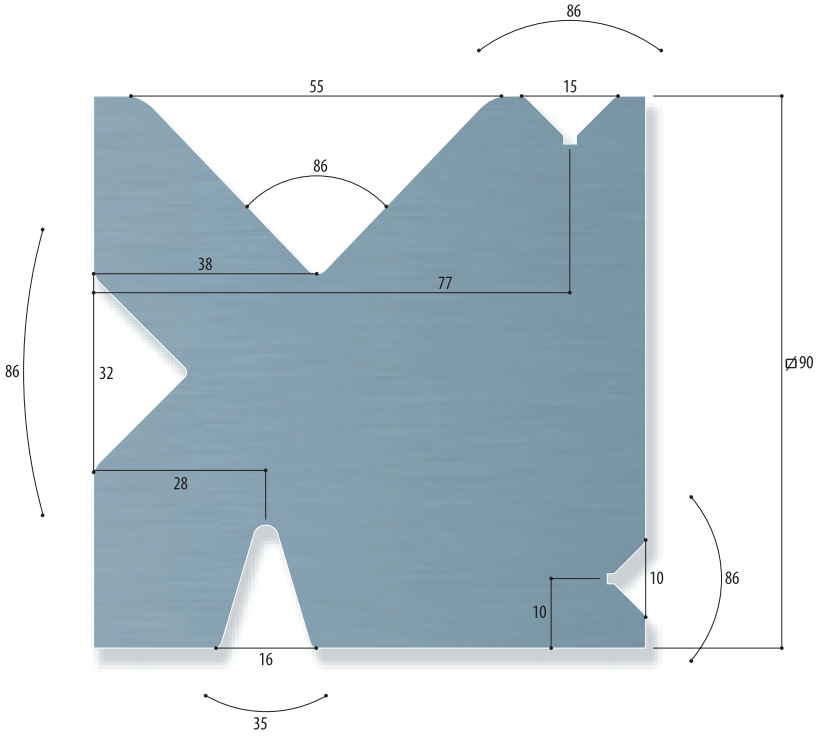
DIE	
60 - 75 T	✶
order number	length
PV7020	2100
PV7025	2600
PV7030	3100



DIE	
100 - 150 T	✶
order number	length
PV9020	2100
PV9025	2600
PV9030	3100
PV9035	3600
PV9040	4100
PV9043	4300



✶ = ex stock

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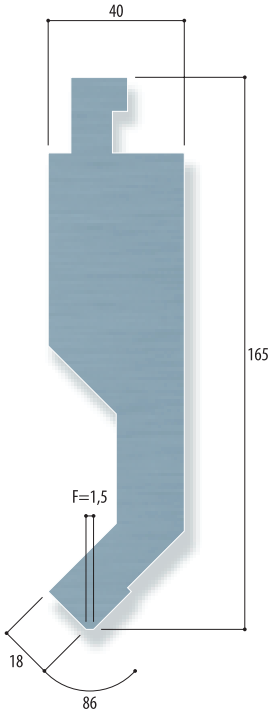
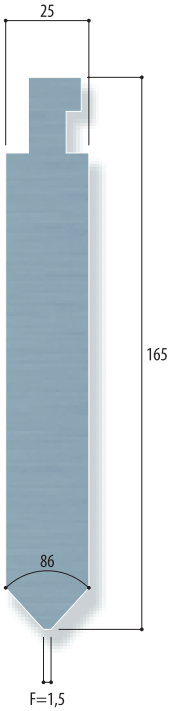
PUNCH

60 - 150 T	✶
order number	length
P110C 20	2100
P110C 25	2600
P110C 30	3100
P110C 35	3600
P110C 40	4100
P110C 43	4300



PUNCH

60 - 150 T	✶
order number	length
P11090 20	2100
P11090 25	2600
P11090 30	3100
P11090 35	3600
P11090 40	4100
P11090 43	4300



✶ = ex stock

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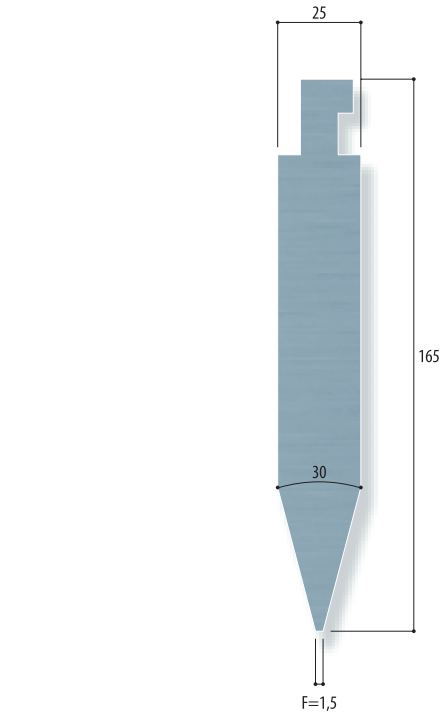
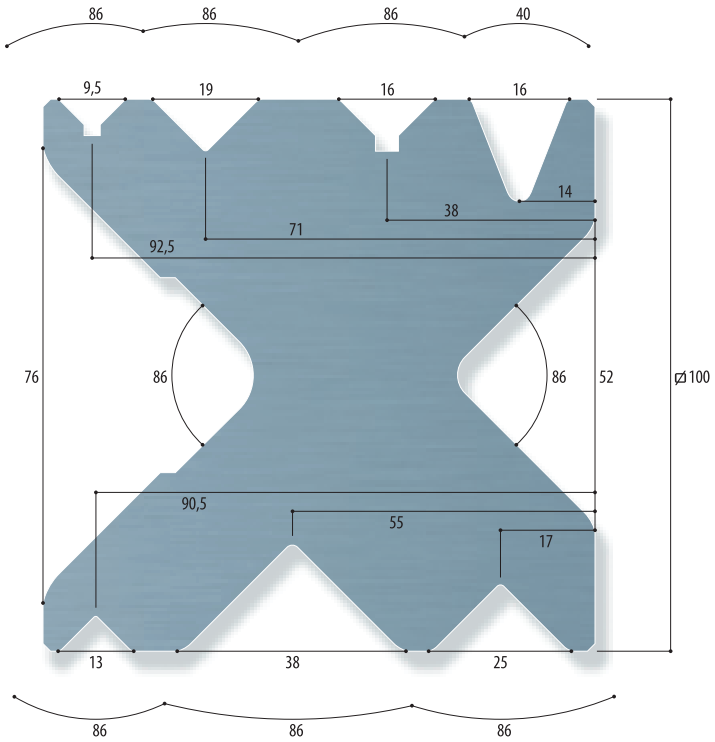
PUNCH	
60 - 150 T	✶
order number	length
P11030 20	2100
P11030 25	2600
P11030 30	3100
P11030 35	3600
P11030 40	4100
P11030 43	4300



DIE	
175 - 260 T	✶
order number	length
PV100 25	2600
PV100 30	3100
PV100 35	3600
PV100 40	4100
PV100 43	4300
PV100 50	5000
PV100 60	6000



✶ = ex stock

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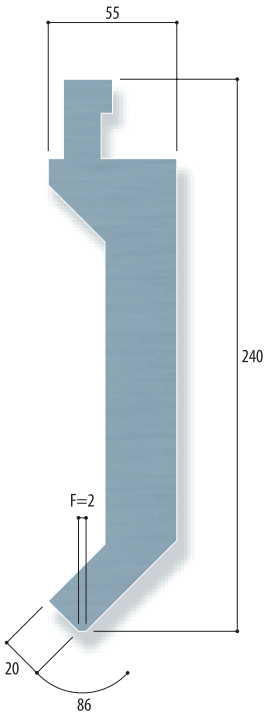
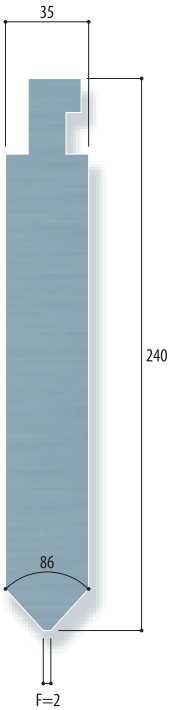
PUNCH

175 - 260 T	✶
order number	length
P200C 25	2600
P200C 30	3100
P200C 35	3600
P200C 40	4100
P200C 43	4300
P200C 50	5000
P200C 60	6000



PUNCH

175 - 260 T	✶
order number	length
P20090 25	2600
P20090 30	3100
P20090 35	3600
P20090 40	4100
P20090 43	4300
P20090 50	5000
P20090 60	6000



✶ = ex stock

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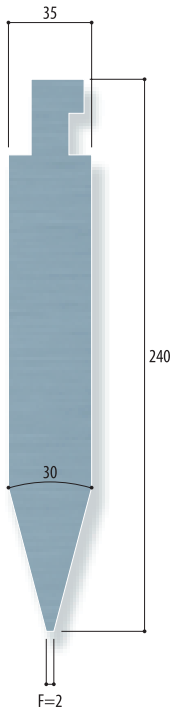
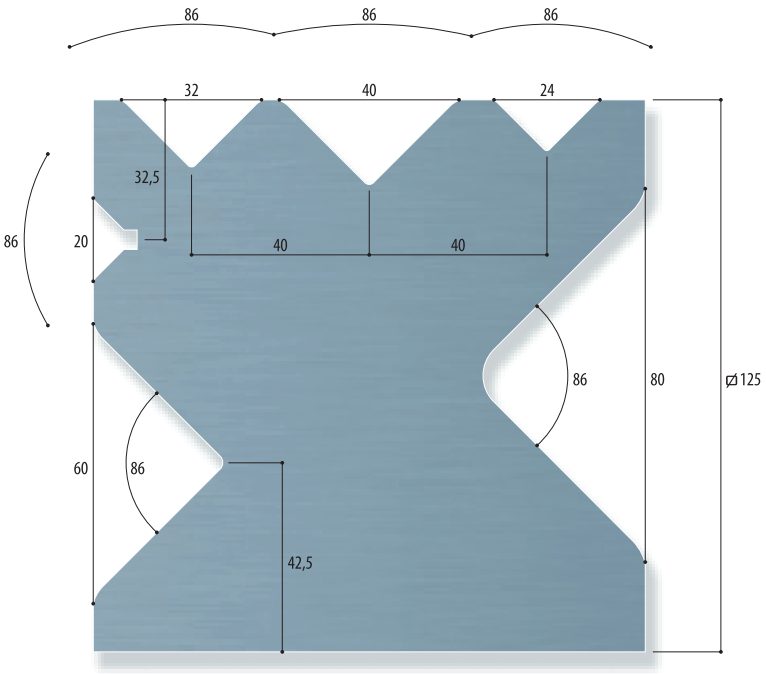
PUNCH

175 - 260 T ✶	
order number	length
P20030 25	2600
P20030 30	3100
P20030 35	3600
P20030 40	4100
P20030 43	4300
P20030 50	5000
P20030 60	6000



DIE

300 - 400 T ✶	
order number	length
PV125 30	3100
PV125 35	3600
PV125 40	4100
PV125 43	4300
PV125 50	5000
PV125 60	6000
PV125 70	7000
PV125 80	8000



✶ = ex stock

HACO TOOLING

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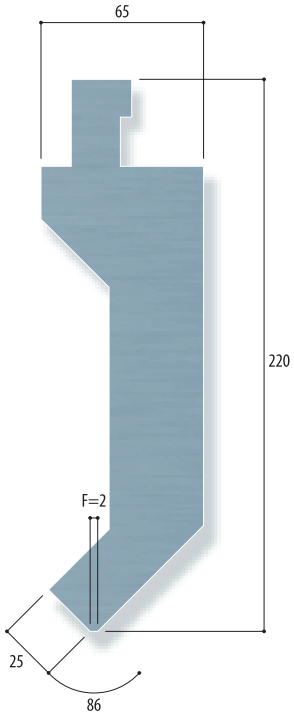
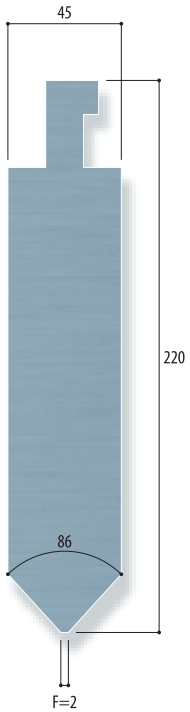
PUNCH

300 - 400 T ★	
order number	length
P400C 30	3100
P400C 35	3600
P400C 40	4100
P400C 43	4300
P400C 50	5000
P400C 60	6000
P400C 70	7000
P400C 80	8000



PUNCH

300 - 400 T ★	
order number	length
P40090 30	3100
P40090 35	3600
P40090 40	4100
P40090 43	4300
P40090 50	5000
P40090 60	6000
P40090 70	7000
P40090 80	8000



★ = ex stock

HACO TOOLING

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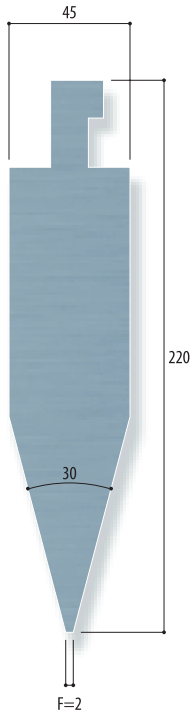
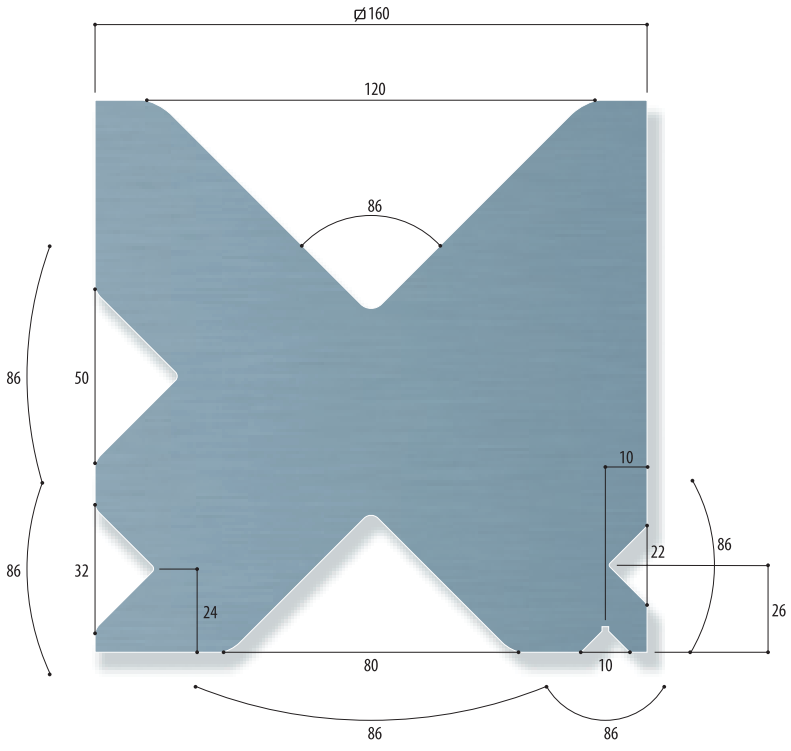
PUNCH

300 - 400 T ✶	
order number	length
P40030 30	3100
P40030 35	3600
P40030 40	4100
P40030 43	4300
P40030 50	5000
P40030 60	6000
P40030 70	7000
P40030 80	8000



DIE

500 - 600 T	
order number	length
PV160 30	3100
PV160 40	4100
PV160 50	5000
PV160 60	6000
PV160 70	7000
PV160 80	8000



✶ = ex stock

HACO TOOLING

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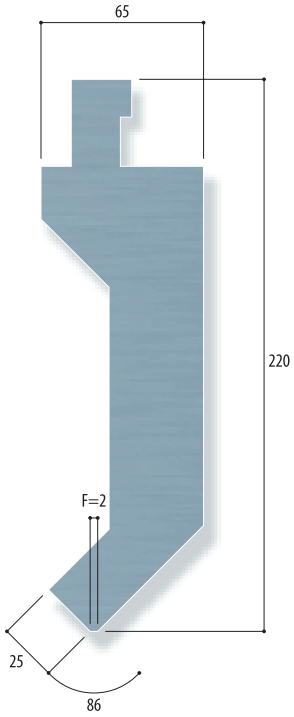
PUNCH

500 - 600 T

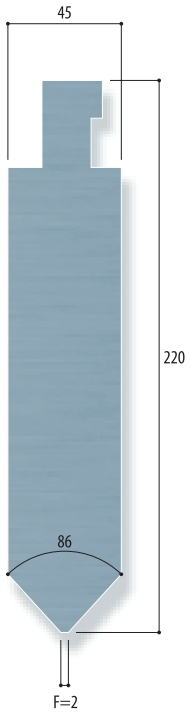
order number	length
P600C 30	3100
P600C 40	4100
P600C 50	5000
P600C 60	6000
P600C 70	7000
P600C 80	8000



PUNCH

500 - 600 T

order number	length
P60090 30	3100
P60090 40	4100
P60090 50	5000
P60090 60	6000
P60090 70	7000
P60090 80	8000



HACO TOOLING

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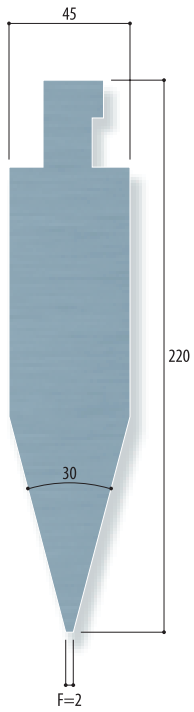
PUNCH

500 - 600 T

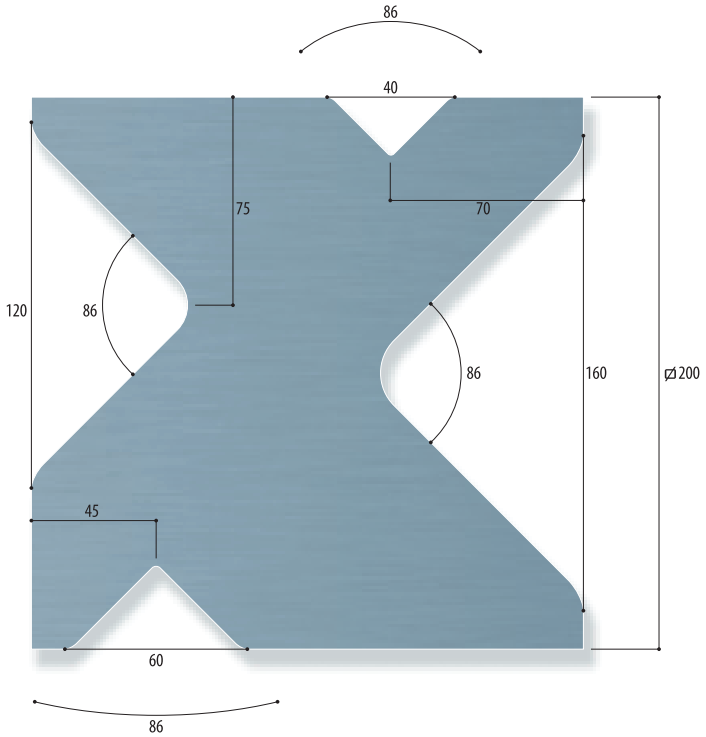
order number	length
P60030 30	3100
P60030 40	4100
P60030 50	5000
P60030 60	6000
P60030 70	7000
P60030 80	8000



DIE

700 - 1000 T

order number	length
PV200 40	4100
PV200 50	5000
PV200 60	6000
PV200 70	7000
PV200 80	8000



SINGLE-V DIES

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FIGURE 29

Single V-dies are available in a large variety of angles and V-openings. The small width/height ratio allows an improved access for the workpiece around the die. Single V-die clamping is using a groove in either a Haco or a System tool table. By using the groove as a self alignment system, the tool change can be reduced to very little time.

Single V-dies have the following characteristics:

- Material ..... C 50
- Shoulder radii are hardened and ground ..... 52 à 58 HRC
- Single-V dies are available in lengths of 500, 1000 and 1100 mm and can be delivered according to the pressbrake bending-length:
  1600 mm = (1 x 1100 mm) + (1 x 500 mm)
  2100 mm = (1 x 1100 mm) + (1 x 1000 mm)
  2600 mm = (1 x 1100 mm) + (1 x 1000 mm) + (1 x 500 mm)
  3100 mm = (1 x 1100 mm) + (2 x 1000 mm)
  3600 mm = (1 x 1100 mm) + (2 x 1000 mm) + (1 x 500 mm)
  4100 mm = (1 x 1100 mm) + (3 x 1000 mm)
  4300 mm = (3 x 1100 mm) + (1 x 1000 mm)
  5000 mm = (5 x 1000 mm)
  6000 mm = (6 x 1000 mm)
- In order to clamp Single-V dies, the table must be equipped with a groove.
- When there is no groove available or when using a table suitable for Haco tooling, an optional fillerblock for Single V-dies (figure 18) can be used. When using this fillerblock, one has to keep in mind that the daylight-opening decreases by 30 mm.
- The dies can be divided into different groups according to the range of the V-opening. Within a certain group, the V-opening can be chosen between a minimum and a maximum value. Each tool is made with a V-opening according to the customers requirement. So, when ordering Single-V dies, do not forget to mention the opening required.
- Certain dies can be delivered with an angle of 86° or 88°. Please indicate the required angle when ordering.
- Single-V dies can be sectionalised when necessary – information is available on request.

Fillerblock for single-v dies.

The fillerblock can be used when a groove for Single-V dies is not present on the pressbrake-table. The fillerblock is manufactured in one full length and needs to be centered by means of positioning screws.

FIGURE 30

FB16 1600
FB20 2100
FB25 2600
FB30 3100
FB36 3600
FB40 4100
FB43 4300
FB50 5000
FB60 6000

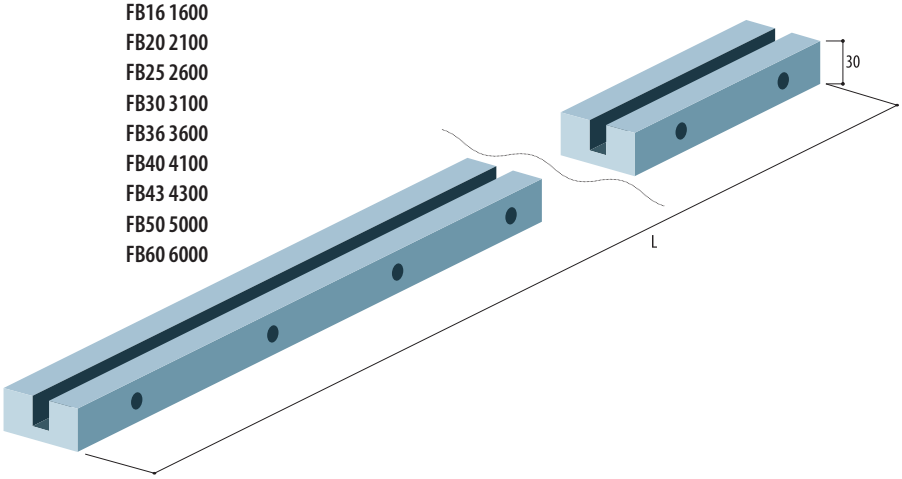
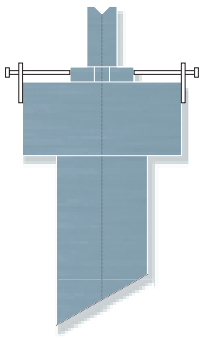


FIGURE 31



Remark: positioning screws are not included.

ADJUSTABLE DIES

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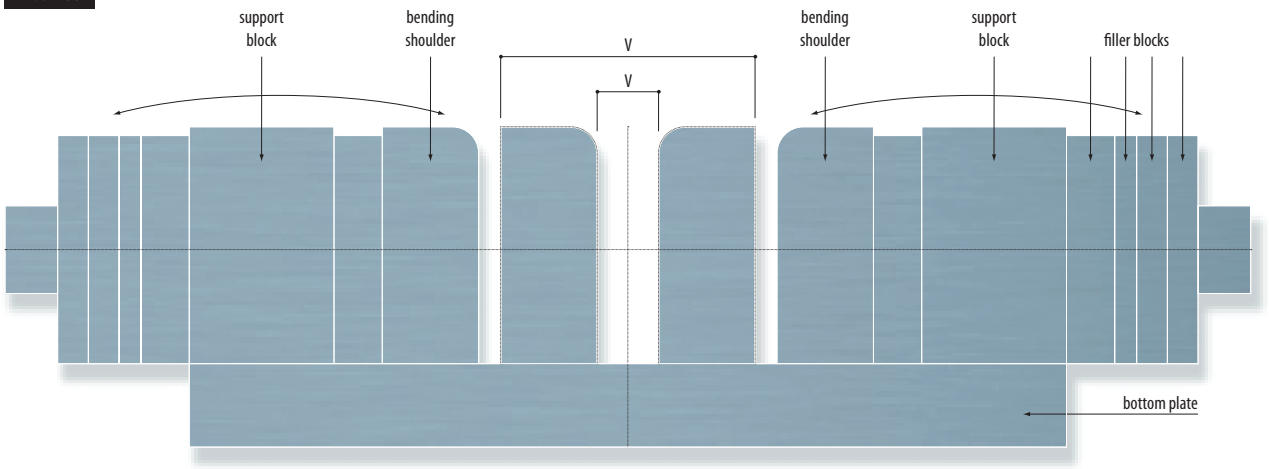
- When using the adjustable die type RS, it is possible to change the V-opening of the die in accordance with the sheet thickness to be bent, thus reducing time-consuming setup-requirements to an absolute minimum. The adjustable die type RS, is supplied with:
  - a bottom plate with support blocks;
  - filler blocks.
  - bending shoulders.

- In order to obtain the required V-opening, filler gauges need to be placed between the bending shoulders and the support blocks. The filler blocks need to be added/removed manually. The bending shoulders are hardened so wear is minimised. Furthermore, the bending shoulders can be supplied with the most ideal radius and can be delivered for retro-fitting if required.

RS 008 ..... range of V-opening: 12 - 80 mm
RS 007 ..... range of V-opening: 60 - 200 mm
RS 007 ..... range of V-opening: 200 - 350 mm

FIGURE 36

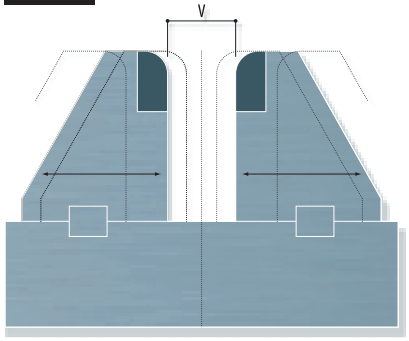


When using MVM type adjustable dies, it is possible to adjust the V-opening within the range of the system. The adjustment can either be manually or CNC-controlled. Timeconsuming setups are almost non-existant – especially advantageous when using big-sized and long tooling. The tooling always keeps the same position, moving the tooling is not needed at all.

- The bending shoulders are hardened and ground and can be supplied with 2 different shoulder radii, so the most ideal radius can be used every time. Changing the shoulder radius only requires turning the bending shoulder one way or the other. MVM adjustable dies are available in following executions:

MVM I 8-32 ..... range: 8 - 32 mm, stepless, manual or CNC-controlled adjustment
MVM I 13-50 ..... range: 13 - 50 mm, stepless, manual or CNC-controlled adjustment
MVM II 40-120. ..... range: 40 - 120 mm, in 10 mm steps, manual or CNC-controlled adjustment
MVM II 40-350. ..... range: 40 - 380 mm, in 20 mm steps, manual or CNC-controlled adjustment

FIGURE 37

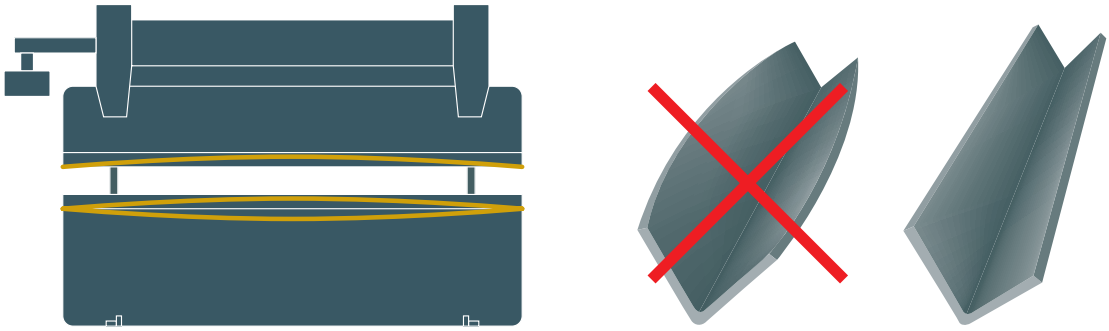


ANTI DEFLECTION TABLES

for impressive performances

Angular variations caused by beam and machine deformation can be compensated for by the anti deflection table fitted directly on the lower beam. It works by means of a system of wedges moving progressively over each other, giving the table the desired form in order to compensate for beam and bed deflection. This results in a constant angular profile of the workpiece over the full working length of the machine. The anti deflection table can be set independently from machine type or execution and is available for standard Haco tooling, system-tooling, Single V-dies and New Standard Tools.

FIGURE 38



The anti deflection table delivered standard with the machines up to 4,3 m 3000 kN is manually controlled by hand wheel. In option, it can be motorised driven, controlled directly by the CNC control. On Euromasters 5/6 m 3000 kN and 3/4 m 4000 kN, the anti deflection table is hydraulic driven and CNC controlled as standard.

for Haco dies only	for Haco dies in combination with Single V-dies	for Single V-dies only	for System dies only	for System dies in combination with Single V-dies

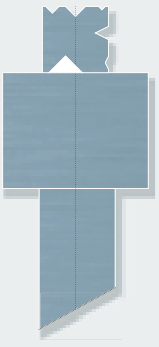
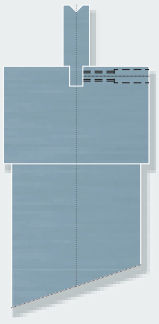
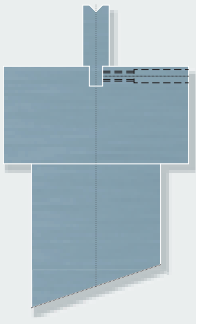
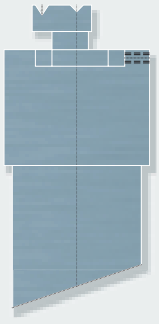
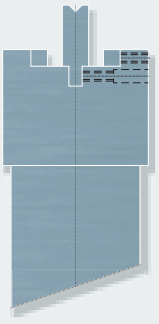

				

FIGURE 39	FIGURE 40	FIGURE 41	FIGURE 42	FIGURE 43

It can be retrofitted on exising Haco or non-Haco machines. Prices and information available on request.

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